RESONANCE-ENHANCED DIELECTRIC SENSING OF CHEMICAL AND BIOLOGICAL SPECIES

Abstract of the Disclosure

A dielectric sensing method and apparatus are provided for detection and classification of chemical and biological materials. Resonance patterns of a sample within a resonator are detected for identifying a shift in resonance frequency and a change of line width before and after introduction of the sample. The identified shift in resonance frequency and change of line width are used for determining a complex dielectric constant of the sample for the material detection and classification. A degree of selectivity at any excitation frequency is enabled for the dielectric sensing method from the manner in which the complex dielectric constant of a material affects the resonance pattern of the resonator with respect to shift in resonance frequency and the change in line width. By selecting the excitation frequencies to generally correspond to one of the resonance frequencies of the sample material under test, the degree of selectivity and the sensitivity of detection are enhanced.